

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 24042000		2. REPORT DATE Final Technical		3. DATES COVERED (From - To) March 1997-September 1999	
4. TITLE AND SUBTITLE Equipment for a Thin-Film Deposition and Characterization Laboratory				5a. CONTRACT NUMBER ---	
				5b. GRANT NUMBER N00014-97-1-0549	
				5c. PROGRAM ELEMENT NUMBER ---	
6. AUTHOR(S) Dr. Gregory D. Lush Department of Electrical and Computer Engineering 500 W. University Avenue University of Texas at El Paso El Paso, TX 79968				5d. PROJECT NUMBER 97PR05304-00	
				5e. TASK NUMBER ---	
				5f. WORK UNIT NUMBER ---	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Texas at El Paso Office of Research and Sponsored Projects Administration Building, Room 209 500 W. University Avenue, El Paso, TX 79968				8. PERFORMING ORGANIZATION REPORT NUMBER ---	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Regional Office San Diego 4520 Executive Drive, Suite 300 San Diego, CA 92121-3019				10. SPONSOR/MONITOR'S ACRONYM(S) ONR	
				11. SPONSORING/MONITORING AGENCY REPORT NUMBER ---	
12. DISTRIBUTION AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE					
13. SUPPLEMENTARY NOTES ---					
14. ABSTRACT See Attached Report					
15. SUBJECT TERMS ---					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Gregory D. Lush
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Electrical and Computer
Engineering Department

April 24, 2000

Ms. Janet Meyers
Department of the Navy--Office of Naval Research
San Diego Regional Office
4520 Executive Drive, Suite 300
San Diego, CA 92121-3019

Dear Ms. Meyers,

This is the final report for grant #N00014-97-1-0549 of the FY 97 Department of Defense HBCU/MI Infrastructure Support Program for Research and/or Education Instrumentation titled, "Equipment for a Thin-Film Deposition and Characterization Laboratory. The total amount of the grant was \$345,600 with \$51,000 of that being a cash match from UTEP. This project had both research and education components. The research component provides support for our research into electroluminescent (EL) displays and into CdTe-based solar cells, both of which are of significant interest to the Department of Defense. This laboratory also supported the Educational Goals of the University as we have developed a graduate course (open to undergraduates) in the Department of Electrical and Computer Engineering at the University of Texas at El Paso (UTEP) on the design, fabrication, testing and characterization of thin-film devices. This grant addressed two areas of strategic priority at UTEP in Electrical and Computer Engineering and in Materials Engineering, and it was supported by substantial university commitments.

The centerpiece of the laboratory is a Kurt Lesker Co. vacuum chamber that provides thin-film deposition by electron beam evaporation, thermal evaporation, and by radio frequency sputtering. It was installed in 1998. Other purchases for the characterization laboratory were completed such that we now have everything installed.

The requested equipment has also been used directly for educational purposes. In the grant proposal we mentioned a collaborative proposal with Purdue University and University of Chicago that was submitted to the NSF to develop a graduate course in which we would introduce our research into our graduate and undergraduate curriculum in an effort to make scientific advancements a part of a flexible curriculum. This project, "Designing Microelectronic Technologies Through a Network-based Simulation 'Hub'," was funded and will continue through 2001.

By combining the two grants we have been able to offer courses and we have added segments to existing courses that take the research we do here and at Purdue University and the University of

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Chicago and integrate the research into our curriculum. Specifically we have offered hands-on experience in the fabrication and testing of thin-film devices, and we have exposed the students in many courses to modern, sophisticated numerical devices simulation tools which have been made available over the Internet. This is a powerful combination.

The simulation tools have been used in four different semesters of Electronic Devices, EE 3329, a junior-level, required course on the fundamentals of semiconductors and semiconductor devices, and in a combined graduate-undergraduate course titled "Computer-based Design of Electronic Devices." In that graduate-undergraduate course and in another titled "Integrated Circuits and Electronic Devices," students have also been shown how to fabricate and test thin-film displays devices.

The presence of the equipment purchased under this grant has already paid off as we have a new grant for the study of CdTe-based solar cells, and we are currently pursuing projects in electroluminescent displays. Since then I have also been granted tenure and been promoted to Associate Professor, partly as a result of my ability to get this grant, and I have won four teaching awards on the UTEP campus.

UTEP has been a big supporter of these two projects as well. In addition to the \$51,000 originally committed to match this grant, UTEP has supported a teaching assistant as a match to the related NSF grant and an additional \$7000 for electrical upgrades and equipment maintenance.

This grant has had a significant impact already and will have for many years.

Please contact me if you have any questions.

Sincerely,



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